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# The prevalence, attitudes and correlates of waterpipe smoking among high school students in Iran: A Cross-Sectional Study

## **Abstract**

**Background:** Waterpipe (WP) smoking is a growing public health concern. However there is little information concerning the prevalence, knowledge, attitudes and cessation of WP smoking among high school students in Iran.

**Purpose:** To determine the correlates of WP smoking among 15-17 year-old high school students in Iran.

**Methods:** Data were collected using the Global Youth Tobacco Survey (GYTS), a self-administrated questionnaire distributed to a representative sample of high school students aged 15-17 in the city of Tabriz. Current WP smoking was defined as past-30 day use and ever WP smoking was defined as at least one or two lifetime puffs. Differences in WP use, knowledge and attitudes were analyzed with Chi square and Fisher exact tests. Binary logistic regression estimated the association between relevant independent variables (e.g. age) and the dependent variables (current/ever WP smoking).

**Results:** Of 1,517 students, 21.6% (95% confidence interval [CI] = 19.5, 23.8) were ever WP smokers, and 9.7% (95% CI = 8.2, 11.2) were current WP smokers. Of current WP smokers, 40.3% have stated that they want to stop smoking now. Moreover 14.1% of non- WP smokers reported that they might enjoy smoking WP. 49.0% of current WP smokers have smoked at cafés. Additionally, 95.3% of the current WP smokers reported that their age did not prevent them from being served a WP. Studying in high school third grade (adjusted odds ratios (AORs) =1.70; 95% CI [1.10, 2.63], experience of cigarette smoking (AORs =1.57; 95% CI [1.12, 2.20], and being prepared to accept a WP offered by close friends (AORs = 3.31; 95% CI [2.17, 5.04]

were independently associated with ever WP smoking, and accepting a WP offered by close friends (AORs = 4.36; 95% CI [2.69, 7.07] and gender (female) (AORs = 0.45; 95% CI [0.30, 0.70] were independently associated with current WP smoking.

Conclusion: Prevalence of current and ever WP use is high in Tabriz. There is an urgent need to design interventions in order to increase students' and their parents' awareness regarding the harmfulness of WP, and to establish legal measures to restrict adolescents' access to WPs and tobacco in society.

Key words: Global Youth Tobacco Survey, High school students, Iran, prevalence of waterpipe/hookah smoking, Student health, waterpipe/hookah smoking

## **Background**

Waterpipe smoking is the oldest form of tobacco smoking and is traditionally prevalent in the Middle East [1]. It is estimated that around 100 million people, especially adolescents, use this method of smoking [2-4]. The WP has different names in different countries such as qalyan, goza, narghile, argileh, shisha, hubble-bubble, hookah, and mu'asel [5, 6].

The WP tobacco smoking device is prepared for smoking by the following steps: The vase is filled with the water, and tobacco is put in the bowl section, and perforated aluminum foil is used to cover the top of the bowl and hot coal is placed above the foil so the tobacco is indirectly heated by the coal. By sucking the hose, smoke passes through a stem column, and is then submerged in water and rises through the water in the vase and finally into the hose port opening and mouth (see Figure 1) [7].

According to the World Health Organization (WHO), the tobacco epidemic is the main threat to global public health, and it kills annually around six million people worldwide. The number of deaths could rise to more than eight million by 2030, of which more than five million are the result of direct tobacco use and around 600 000 are due to second-hand exposure to smoke.

About 80% of smokers worldwide are from low- and middle-income countries and thus these societies suffer the highest burden of tobacco-related disease [8]. Most of the research concerning tobacco use (e.g. prevention) focuses on cigarette smoking and is conducted in developed countries despite the fact that the majority of the affected persons are in under-developed and developing countries, so research on this type of tobacco use is a neglected area [9, 10]. Since the 1990s, the WP has spread to the Western world, mainly among young people and young adults of both sexes [11], and recently it has been gaining popularity in Europe (e.g. UK) as well as in the USA and Australia [12]. Unfortunately, in the Middle Eastern countries WP smoking, especially among the youth, has increased and turned into a major leisure pastime [13, 14]. The prevalence of WP smoking in developing countries increases by 3.5% annually, mainly among youth [2, 15-17]. For instance, in Saudi Arabia, the prevalence of WP smoking between 2002 and 2007 increased from 6.8% to 8.7% among 13-15 year-old school students [17, 18]. The national fact sheets from the Global School Based Student Health Survey (GYTS) among middle school (grades 1 and 2) and high school (grade 1) students in Iran in 2007 showed that 16.5% of students were current (smoked WP within last 30 days) WP smokers. Of these, 22.8% were boys and 9.4% were girls. The percent of students who had at some point smoked or tried WP, even if only one or two puffs were 43.8% [19], which is a dramatic increase in comparison with GYTS 2003, where only 12.1% of students were current WP smokers [20].

This increase can be explained by several reasons: the main one is the misconception that WP smoking is less harmful than cigarette smoking due to the smoke being passed through the water and filtered prior to inhalation [4, 21]. Other factors that attract WP smokers, especially adolescents, are its aromatic and condensed smoke, attractive pipe design, availability, inexpensive tobacco, and social acceptance because of traditional associations and it being less stigmatized than cigarette smoking [22]. WP smoking is a new challenge for global public health efforts [23], and recent studies have shown that WP smoke is more harmful than cigarette

smoke, because one session of WP smoking expose it's users to a larger amount of smoke and higher level of tobacco toxicants such as tar, carbon monoxide, nicotine, and arsenic compared with one cigarette [24-29]. WP smoking is considered to be associated with lung cancer, esophageal cancer, low birth weight, periodontal diseases, and pulmonary dysfunction [30]. Non-tobacco components in aromatic tobaccos may expose WP smokers to metals and cancer-causing chemicals [31].

The Iranian government prioritized tobacco control in its public health agenda. On 16 June 2003, Iran signed the WHO Framework Convention on Tobacco Control (FCTC) and then ratified it on 6 November 2005[32]. The measures in the FCTC include increasing tobacco taxation, protection from second-hand smoke, bans on tobacco advertising, and health warning labels on tobacco packaging. According to the research, in order to be effective the health warning on the tobacco packages intended to impact on WP smoking attitudes should be compliant with existing laws and visible to end-users. It should also be visible on WP accessories, such as the hose and displayed at serving premises [33].

Surveillance projects are considered as an integral part of the tobacco control program. In Iran very limited studies have been performed about WP smoking prevalence and its correlates especially among high school students [34, 35]. Many of these studies are about cigarette smoking [36, 37]. Moreover none of the studies used the comprehensive standardized questionnaire to collect students' knowledge, attitudes, cessation, current and passive WP smoking modules to study them alongside with prevalence and correlates of WP smoking. Also there was not any reliable, and valid questionnaire in Persian for gathering data for WP smoking. To bridge this data and instrument gap and to document the extent of the problem, the authors designed the present study and used the reliable, valid Persian version of the GYTS comprehensive questionnaire validated by experts [38] to determine the prevalence and correlates of WP smoking alongside with students' knowledge, attitudes and their tendency to

cessation, which may be useful for designing interventions to reduce WP smoking among high school students in Tabriz.

## **Methods**

### Study site and sampling

The present cross-sectional study was conducted in Tabriz, a city located in the north west of Iran with 1 695 094 inhabitants. During the 2013-14 academic year, there were 62 714 high school students (grades 1-3), of which 29 935 were female and 32 779 male. Tabriz is split up into five city districts. A two-stage cluster sampling was used to select representative high schools and classes. At the first stage, high schools were selected with probability proportional to the enrollment size and at the second stage, classes were randomly selected, and all students in the selected classes were invited to participate in the study. Overall, 30 high schools, including 16 girls' and 14 boys' high schools, 90 classes and 1 800 students aged 15 to 17 were chosen. The schools' response rate was 100%.

### Sample size calculation

Due to the shortage of the relevant studies, to give required information for the calculation of the sample size for assessing correlations, the sample size was calculated based on prevalence estimation objective according to the final GYTS fact sheet [19].

In calculation of the sample size, a confidence level equal to 95 %, prevalence equal to 16.5%, and an acceptable error equal to 2.48 % were applied giving rise to a sample size of 864 people for simple random sampling. With respect to the cluster sampling method used in this study, the calculated sample size was multiplied by a design effect equal to 2. Assuming 4% attrition correction, a total sample size of 1800 was decided to be used in this study.

## Data collection

For the present study, data were collected through anonymous, self-administered, reliable and valid questionnaires of the Persian Version of GYTS's optional modules for WP smoking (version 1.0 July 2012) [38,39]. WP smoking module includes questions about demographic factors, legislation, prevalence and smoking, knowledge, attitude, cessation, and correlates of WP smoking (Appendix 1). Data collection took place between 26 December 2013 and 10 February 10 2014. GYTS is a self-administered school-based questionnaire for monitoring tobacco use among students designed by WHO, with technical support of the United States Center for Disease Control and Prevention (CDC) as a global, youth tobacco surveillance system. During an ordinary school day, self-administered questionnaires were distributed to students in selected schools and classes by Province Health Center staff, who, one week prior to the survey date, had attended a workshop on GYTS methodology. Answering time for questions was 15-20 minutes.

## Data processing and analysis

### Measures

Our dependent outcome variable was "Have you ever tried or experimented with WP smoking, even just one or two puffs?" and the answer was dichotomous Yes or No.

Students who had smoked WP during the past 30 days were defined as Current WP smokers.

Current WP smokers were derived from the question "During the past 30 days, on how many days did you smoke WP?" and answers for this question was "0 days, 1 or 2 days, 3 to 5 days, 6 to 9 days, 10 to 19 days, 20 to 29 days and all 30 days" and anyone answering anything other than "0 days" was considered as a current WP smoker. The number of WP smoking days in the past 30 days which also derived from the question "During the past 30 days, on how many days

did you smoke WP?" the answers were divided into: under 5 days, including 1 to 5 days; and above 5 days, including 6 to 30 days.

The age of initiation into WP smoking is derived from the question "How old were you when you first tried smoking WP?" and answers were divided into two categories: younger than 12 years, including 7 to 11 year-olds; and older than 12 years, including 12 to 17 year-olds.

Parental smoking derived from the question "Which of your parents use any form of tobacco (WP or cigarettes)?" and the answers "None", "My father", "My mother", "both" and "I don't know" classified into "Yes" or "No". "My father", "My mother" and "both" classified as "Yes" and "None" classified as "No", "I don't know" was considered as missing in analysis.

Accepting WP offered by best friend derived from the question "If one of your best friends offered you WP, would you smoke it?" and the answers "Definitely not", "Probably not", "Probably yes", and "Definitely yes", classified into "Yes" or "No". "Yes" for "Probably yes", and "Definitely yes" and "No" for "Definitely not", "Probably not".

#### Statistical analysis

During data processing, 283 out of 1 800 answer sheets as a whole study sample were deleted from the data entry because of missing data. The remaining 1517 answer sheets were used for data entry and analysis, the students' response rate was 84.27%. SPSS version 22 was used for data entry and analysis. Descriptive statistics (Frequency, Percentages, Mean and Standard Deviation), were used to analyses categorical and continuous scales, the Chi square, and Fisher exact test were used to assess associations among categorical variables. A binary multivariate logistic regression was used to assess the association between relevant independent variables such as age, gender, grade, cigarette smoking of students, parent's cigarette smoking and accepting WP offered by a friend and the dependent outcome variable (Ever tried or experimented with WP smoking, even one or two puffs?, yes/no and Did you smoked WP during the past 30 days (current smokers)? Yes/no). Reporting adjusted odds ratios was done

after controlling for factors identified as significant in the bivariate analysis. Adjusted odds ratios (AORs) along with their 95 % confidence intervals (CI) were reported. Through the pre-modeling bivariate analysis associations with  $p\text{-value} < 0.1$  were considered to be further investigated of an independent role through multivariate analysis. For all other statistical tests a  $p\text{-value} < 0.05$  was considered as statically significant.

#### Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of Tabriz University of Medical Sciences. One week prior to the questionnaire administration, consent forms were given to all parents of students from the participating classes by the school authorities and these were collected from students on the day of administration. All students were informed about the voluntary and anonymous nature of the study and they were told they were free to break off their participation at any time during the answering of the questions.

#### Results

The data from a total of 1 517 questionnaires were used for analysis, of which 727 (47.9%) were male and 790 (52.1%) were female. Students' ages ranged from 15 to 17 with a mean of  $16.1 \pm 0.76$ . 435 (28.7 %) students were from grade 1, 539 (35.5%) from grade 2 and 543 (35.8%) were from grade 3 at high school level. From the total of 1 517 students, 327 (21.6%, 95% CI = 19.5, 23.8) were ever WP smoker; of those, 159 (48.7%, 95% CI = 43.2, 54.0) were male and 168 (51.3%, 95% CI = 45.9, 56.7) were female (Table 1).

147 (9.7%, 95% CI = 8.2, 11.2) students were classified as current WP smokers. Of these, 98 (66.6 %, 95% CI = 58.5, 73.8) were male and 49 (33.4%, 95% CI = 26.1, 41.4) were female. Of the total 147, the vast majority 124 (84.3 %, 95% CI = 74.4, 89.4) of those reporting current WP smoking had smoked WP on only one or two days. Of the 327 students who had reported

age at the initiation of WP smoking, 293 (89.6%, 95% CI = 85.7, 92.4) were older than 12 and 34 (10.4%, 95% CI= 7.5, 14.2) were younger than 12.

Of the 147 current WP smokers, 134 (91.1%, 95% CI = 85.2, 94.8) students smoked 1 session per day, during the days that they have smoked WP (Table 1), 16 (10.8%, 95% CI = 6.7, 17.1) students smoked at home, 32 (21.7%, 95% CI = 15.7, 29.2) smoked at a coffee shop, 7(4.7%, 95% CI = 2.2, 9.7) smoked at a restaurant, 72 (49%,95% CI = 40.9, 57.1) smoked at a café (Ghahvekhaneh), and 20 (13.6%,95% CI = 8.9, 20.2) smoked at other places. 381 (25.1%, 95% CI = 22.9, 27.3) students reported that their parents smoked WP or cigarettes, of whom 205 (53.8%, 95% CI = 48.7, 58.7) were male and 176 (46.1%, 95% CI = 41.2, 51.2) were female. 7 (4.7%, 95% CI = 2.2, 9.7) students from the current WP smokers reported that because of their age, someone had refused to serve WP to them and 140 (95.2%, 95% CI = 90.2, 97.7) students reported that their age did not prevent them from being served WP. From the 200 students who answered the question regarding stopping WP smoking during the past 12 months, 49 (24.5%, 95% CI = 18.9, 30.9) students had tried to quit smoking (40.8% of males and 59.2% of females). Of 147 (9.7%, 95% CI = 8.2, 11.2) students who were current WP smoker, 91 (61.9%) reported that they did not notice any health warning on the WP tobacco packages, 20 (13.6%) reported that they saw the warning and that it led them to quit or not start WP smoking, and 36 (24.5% ) said they saw it but they did not think about it. 1 288 (84.9%, 95% CI = 83.0, 86.6) students reported that they had never smoked or experimented with cigarettes and 229 (15.1%, 95% CI = 13.3, 16.9) had smoked or experimented with cigarettes even one or two puffs, of whom 146 (63.7%, 95% CI = 57.2, 69.7) were male and 83 (36.2%, 95% CI = 30.2, 42.7) were female.

Table 2 shows the knowledge and attitudes of WP smokers. 105 (6.9 %, 95% CI = 5.7, 8.3) students from the overall study participants, reported that they would accept WP if offered by their friends, of whom 60 (57.1%) were male and 45 (42.9%) were female. 1 069 (70.5%, 95% CI = 68.1, 72.8) students thought that the WP smoke from other people's WPs was harmful for

them, of whom 531 (49.6%) were male and 538 (50.4%) were female. 1 212 (79.9%, 95% CI = 77.7, 81.8) students reported that quitting WP smoking was not difficult, of whom 629 (51.8%) were male and 583 (48.2%) were female. 570 (37.5%, 95% CI = 35.1, 40.0) students, in answer to the question about how smoking a WP made them feel, declared that there was no difference regardless of whether people smoked WP or not. 214 (14.1%, 95% CI = 12.4, 15.9) students from non-current WP smokers thought that they might enjoy smoking a WP, of whom 106 (49.5%) were male and 108 (50.5%) were female. From 186 (12.2%) students who answered the question regarding stopping WP smoking now, 75 (40.3%, 95% CI = 33.4, 47.5) said yes of whom 45 (60.0%) were male and 30 (40.0%) were female, and 111 (59.6%, 95% CI = 52.4, 66.5) said no of whom 69 (62.1%) were male and 42 (37.9%) were female. Between the age of initiation of WP smoking and the number of the days of WP smoking during past 30 days, a significant statistical relationship was observed: the students who started WP smoking under 12 years old (<12) had a significantly higher frequency (days) of WP smoking ( $P = 0.02$ ). The authors also observed a significant relationship between WP and cigarette smoking. 28.4% of those who reported cigarette smoking at least once reported WP smoking too ( $P = 0.009$ ). Three factors in Table 3 indicate significant odds ratios for ever WP smoking that include: being in 3<sup>rd</sup> grade of high school (AOR =1.708; 95% CI [1.106, 2.638], having experienced cigarette smoking, even one or two puffs (AOR =1.570; 95% CI [1.121, 2.200] and accepting a WP offered by close friends (AOR = 3.311; 95% CI [2.173, 5.045]. Two factors in table 4 indicate significant odds ratios for current WP smoking that include: accepting a WP offered by close friends (AORs = 4.36; 95% CI [2.69, 7.07] and gender (female) (AORs = 0.45; 95% CI [0.30, 0.70].

## Discussion

This study has shown that 21.6% of high school students in Tabriz have experienced WP smoking at least once. The results have shown that there is no gender difference towards ever WP smoking and it is attractive to both genders. This is despite the traditional intolerance against WP smoking among women and the resulting stigmatization. In total, 9.7% of students were categorized as current WP smokers. The initiation into WP smoking at an early age is very important: 10.4% of students reported their initiation into WP smoking as being at an age younger than 12 years.

We have observed a significant association between the initiation of WP smoking under 12 years old and the number of the days of WP smoking during the previous 30 days. This means that the students who smoked WP for the first time under 12 years old, now smoke more days than the students who started smoking over 12 years old. This fact also raises the question as to how a child younger than 12 years old could have smoked a WP, because buying tobacco and the preparation of a WP is not something that can be done by an 11-year-old or younger child. This suggests that the parents or guardians or relatives prepared the WP for the child. This fact raises concerns about the important role of the family and reveals that some parents are neglecting their responsibilities to their children as regards tobacco use and prevention. It also serves as a warning to the authorities regarding the major role that some parents or families have played in encouraging or facilitating their children's access to WP smoking. On the other hand, by considering the current WP smokers, our findings show that most WP smokers smoked WP once or twice a month, usually for one session, this fact can be reflect the belief that WP isn't primarily as addictive as cigarettes. High level of infrequent use of the WP may due to the unavailability of the WP in terms of a place for smoking and the ownership of a WP at home, because most adolescents hide their WP smoking from their parents. When a WP is available

at home it means somebody in the family other than adolescents is using it and this makes it easy for adolescents to smoke and share it with family members without fear from parents.

In the longitudinal study that was done in Tabriz among high school students between 2010 and 2011, the prevalence of WP smoking was reported as 6% so that our study showed it had increased by 3.7% in around three years. This increase shown in our study also may support the findings of the previously mentioned study which claimed that 18.5% of students who had previously never smoked WP turned into WP experimenters (even one or two puffs) and 1.5% of WP experimenters turned into regular WP users (current WP smokers)[34]. According to a study that was done in Tehran in 2012, the prevalence of WP smoking among women 15-24 years age was 6.9% [40] and in the southern cities in Iran, it was 8.2% [41]. The national GYTS survey that was done in 2007 in Iran among 1 996 middle-school students aged 13-15 showed that 43.8% of students had smoked WP at least once, of whom 55% were males and 32% were females, and 16.5% were current WP smokers, of whom 22.8% were males and 9.4% were females[19]. Therefore previous studies support the argument that WP smoking is increasing among 15-24 year-olds despite the difference in percentages between WP smoking in country provinces and among different ages and educational stages that can be described by the culture of the society in which the study has been done. Tehran is a big city with around 14 million inhabitants and most of them have moved there from other cities; this means it is multi-cultural city, in contrast to Tabriz which has a mono-cultural society. Iranian society consists of different ethnic groups, such as Azari, Arab, Kurdish, Turkmen, Baloch, and the Lurs people. Each of these groups have their own culture, and Tehran has immigrants from all of them. Tabriz with its Azeri population is a small city in comparison with Tehran. It has very few members of other ethnic groups, and has rigid ideas about tobacco smoking especially among adolescents and females. In a study in Saudi Arabia [18], half of the students smoked WPs at cafés which shows how cafés in the Middle East are the main place for WP smoking. On the other hand, half of

the females, who are socially restricted in Saudi Arabia, smoked WPs in their homes in contrast in our study where just 14.2% of the current female WP smokers have smoked at their homes and 40.8% smoked WP at coffee shops which broke the rules and served WP to their under-age customers.

Of the current WP smokers, 49% have smoked WPs at a certain kind of café known as a Ghahvehkhaneh. These are common in Iranian society and are somewhat controversial as they serve tea with WP to everyone, mostly to males, regardless of their age. These traditional cafés have today turned into places where, instead of being a meeting place for elder people, they have now become somewhere where adolescents gather in their spare time, with their friends to drink tea and smoke WP. Because of these cafés' traditional and cultural influence on society, the authorities find it difficult to act appropriately and to restrict WP access to adolescents while visiting them. This is despite the fact that the cafés have been designated as smoke-free zones according to Iranian FCTC regulations [32].

These facts and our study findings that 95.3% of current WP smokers reported that their age did not prevent them from being served WP deserve serious consideration. Once again, the essential need to ban both sales and the serving of WP and tobacco products to those under 18 is highlighted. This is now a major challenge for the public health authorities.

70.5% of students reported that being exposed to second-hand WP smoke was harmful for their health, so most students were aware about the harmfulness of WP smoke. Despite this awareness, 7.3% of WP smokers stated that they did not want to stop smoking now and on the other hand 14.1% of non-WP smokers reported that they might enjoy smoking WP which reveals their positive attitude towards it. According to the study results, among college students, a positive attitude toward WP smoking was strongly related with increased odds ratio of being a current and regular user of WP in the future [42]. Willingness to accept the offer to smoke a WP from close friends, something which 6.9% of the students stated they had experienced, is

an important matter which should be taken into consideration by the public health authorities. There is a need to raise the students' awareness about how to say "no" to a friend when they suggest or request a high-risk action, because when this situation is accompanied by a positive attitude towards WP smoking, this can lead to the transition from never WP smokers to experimental WP smokers [34].

Our study revealed some points, which should be a warning for the public health authorities. The first WP experimentation was at the same level for both genders. Public health authorities should take notice of that fact that there is an increased tendency for girls to experiment with WP smoking. Easy access to WP and it being served to under-18s in cafés, and being prepared for some students by their parents are important factors for their age of initiation into WP smoking.

Some explanation for the low prevalence of WP use in Tabriz compared to national average GYTS [19] could be that the source population for the national GYTS study and the our study have been different, our study was conducted only in an urban setting while the national GYTS study has included both urban and rural areas but unfortunately has not reported the separate figures for the rural and urban areas, secondly we have conducted our study in Tabriz city which is one of the five mega cities of Iran and the behavioral patterns may differ in mega cities compare to other cities, as the third explanation the differences in cultural norms of Tabriz with the overall pattern in Iran could be considered.

This study has some limitations that should be taken into consideration. First, we had 15.7% attrition. Although this is a common condition in similar studies [3] it should be considered through the interpretation of the results and the real prevalence may be even higher than the proportion reported in the present study. Second this study is cross-sectional and limited to the grade 1-3 high school students in Tabriz; third, self-administered questionnaires were used for

data gathering and results were not biochemically verified. Despite the anonymous nature of the study, we had no method to detect the underreporting of WP smoking.

### **Conclusion**

Our study shows a low prevalence of WP smoking in Tabriz in comparison with national surveys, but the prevalence of WP experimentation and smoking is high, among both males and more surprisingly females, in high schools. There is an urgent need for the design of interventional studies in order to increase students' and their parents' awareness regarding the harmfulness of WP and to restrict adolescents' access to WP and tobacco in society.

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Appendix1- Questions of WP smoking

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Demographic data

- How old are you?
- What is your sex?
- In what grade/form are you?

WP Use

- Have you ever tried or experimented with WP smoking, even just one or two puffs?
- How old were you when you first tried smoking WP?
- During the past 30 days, on how many days did you smoke WP?
- Please think about the days you smoked WP during the past 30 days. How many WP smoking sessions did you usually participate in per day?

Cessation

- Do you want to stop smoking WP now?
- During the past 12 months, did you ever try to stop smoking WP?

Passive smoking

- Do you think the smoke from other people's WP smoking is harmful to you?
- The last time you smoked WP during the past 30 days, where did you smoke it?
- During the past 30 days, did anyone refuse to serve you WP because of your age?
- During the past 30 days, did you see any health warnings on WP tobacco packages?

Knowledge and Attitudes

- If one of your best friends offered you WP, would you smoke it?
- Once someone has started smoking WP, do you think it would be difficult for them to quit?
- Do you think smoking WP helps people feel more comfortable or less comfortable at celebrations, parties, or at other social gatherings?
- Do you agree or disagree with the following: "I think I might enjoy smoking WP."

Predictors

- Which of your parents or guardians use any form of tobacco (WP or cigarettes)?
  - Have you ever tried or experimented with cigarette smoking, even one or two puffs?
-

Table 1- Characteristics of students (n =1517)

Variable	Male no. (%)	Female no. (%)	Total no. (%)
<b>Ever tried or experimented with WP smoking, even one or two puffs?</b>			
<i>No</i>	568 (78.2%)	622 (78.7%)	1190 (78.4%)
<i>Yes</i>	159 (21.8 %)	168 (21.3 %)	327 (21.6%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
<b>How old were you when you first tried smoking WP?</b>			
<i>Never smoked WP</i>	568 (78.2%)	622(78.7%)	1190 (78.4%)
<i>Younger than 12 years</i>	7 (1.00%)	27 (3.4%)	34 (2.2%)
<i>Older than 12 years</i>	152 (20.8%)	141 (17.9%)	293 (19.4%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
<b>During the past 30 days, on how many days did you smoke WP?</b>			
<i>I have never smoked WP</i>	568 (78.2%)	622 (78.7%)	1190 (78.4%)
<i>I didn't smoke during the last 30 days (Of those who have tried just once)</i>	61 (8.3%)	119 (15.1%)	180 (11.9%)
<i>Under 5 days</i>	93 (12.8%)	47 (6%)	140 (9.2%)
<i>Above 5 days</i>	5 (0.7%)	2 (0.2%)	7 (0.5%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
<b>In the past 30 days, how many WP smoking sessions did you usually participate in per day?</b>			
<i>I did not smoke WP during the past 30 days</i>	629 (86.6%)	741 (93.8%)	1370 (90.3%)
<i>1 session per day</i>	88 (12.1%)	46 (5.9%)	134 (8.8%)
<i>2 sessions per day</i>	9 (1.2%)	3 (0.3 %)	12 (0.8%)
<i>3 sessions per day</i>	1 (0.1%)	0 (0.00%)	1(0.1%)
<i>4 or more sessions per day</i>	0 (0.00%)	0 (0.00%)	0 (0.00%)
<i>Total</i>	727 (47.9%)	790 (52.1%)	1517 (100%)
<b>During the past 30 days, where did you smoke WP?</b>			
<i>I did not smoke WP during the past 30 days</i>	629 (86.6%)	741 (93.8%)	1370 (90.3%)
<i>At home</i>	9 (1.3%)	7 (0.9%)	16 (1.0%)
<i>At a coffee shop</i>	12 (1.7%)	20 (2.5%)	32 (2.1%)
<i>At a restaurant</i>	2 (0.3%)	5 (0.6%)	7 (0.5%)
<i>At a café (Ghahvehkhaneh)</i>	68 (9.4%)	4 (0.5%)	72 (4.8%)
<i>Other places</i>	7 (0.7%)	13 (1.7%)	20 (1.3%)
<i>Total</i>	727 (47.9%)	790 (52.1%)	1517 (100%)
<b>Which of your parents use any form of tobacco (WP or cigarettes)?</b>			
<i>None</i>	504 (69.3%)	607 (76.8%)	1111 (73.2%)
<i>My father</i>	169 (23.2%)	170 (21.5%)	339 (22.3%)
<i>My mother</i>	12 (1.7%)	4 (0.5%)	16 (1.1%)
<i>Both</i>	24 (3.3%)	2 (0.2%)	26 (1.7%)
<i>I do not know</i>	18 (2.5%)	7 (0.88%)	25 (1.6%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
<b>Did anyone refuse to serve you WP because of your age?</b>			
<i>Didn't try to get WP in the last 30 days</i>	629 (86.5%)	741(93.8%)	1370 (90.3)
<i>Yes</i>	3 (0.4%)	4 (0.5%)	7 (0.4%)
<i>No</i>	95 (13.1%)	45 (5.7%)	140 (9.22%)
<i>Total</i>	727 (47.9%)	790 (52.1%)	1517 (100%)
<b>During the past 12 months, did you ever try to stop smoking WP?</b>			
<i>I have never smoked WP</i>	568 (78.2%)	622 (78.7%)	1190 (78.4%)
<i>I didn't smoke WP during the past 12 months</i>	47 (6.5%)	80 (10.1%)	127 (8.4%)
<i>Yes</i>	20 (2.7%)	29 (3.7%)	49 (3.2%)
<i>No</i>	92 (12.6%)	59 (7.5%)	151 (10.0%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
<b>Have you noticed any health warnings on WP tobacco packages during the past 30 days?</b>			
<i>Yes, but I did not react to them</i>	148 (20.4%)	237 (30.0%)	385 (25.4%)
<i>Yes, and they led me to think about quitting or not start WP smoking</i>	88 (12.1%)	127 (16.0%)	215 (14.2%)

<i>No</i>	491(67.5%)	426 (54.0%)	917 (60.4%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
Ever tried or experimented with cigarette smoking, even one or two puffs?			
<i>No</i>	581(79.9%)	707(89.5%)	1288 (84.9%)
<i>Yes</i>	146 (20.1%)	83 (10.5%)	229 (15.1%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)

Table 2- Knowledge and Attitudes of Students (n=1517)

Variable	Male no. (%)	Female no. (%)	Total no. (%)
If one of your best friends offered you WP, would you smoke it?			
<i>No</i>	667 (91.7%)	745(94.3%)	1412 (93.0%)
<i>Yes</i>	60 (8.3%)	45 (5.7%)	105 (7.0%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
Do you think the smoke from other people's WP smoking is harmful to you?			
<i>No</i>	196 (27.0%)	252 (31.9%)	448 (29.5%)
<i>Yes</i>	531 (73.0%)	538(68.0%)	1069(70.5%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
Once someone has started smoking WP, do you think it would be difficult for them to quit?			
<i>No</i>	629 (86.5%)	583 (73.8%)	1212 (79.9%)
<i>Yes</i>	98 (13.5%)	207 (26.2%)	305 (20.1%)
<i>Total</i>	727 (47.9 %)	790 (52.1 %)	1517 (100%)
Do you think smoking WP helps people feel more comfortable or less comfortable?			
<i>More comfortable</i>	264 (36.3%)	314 (39.8%)	578 (38.1%)
<i>Less comfortable</i>	170 (23.4%)	199 (25.1%)	369 (24.3%)
<i>No difference</i>	293 (40.3%)	277 (35.1%)	570 (37.6%)
<i>Total</i>	727 (47.9%)	790 (52.1 %)	1517 (100%)
Agree or disagree "I think I might enjoy smoking WP."			
<i>I currently smoke WP</i>	96 (13.2%)	51 (6.4%)	147 (9.7%)
<i>Strongly agree</i>	45 (6.2%)	24(3.0%)	69 (4.5%)
<i>Agree</i>	61 (8.4%)	84 (10.7%)	145 (9.6%)
<i>Disagree</i>	229 (31.5%)	256 (32.4%)	485 (32.0%)
<i>Strongly disagree</i>	296 (40.7%)	375 (47.5%)	671 (44.2%)
<i>Total</i>	727 (47.9%)	790 (52.1 %)	1517 (100%)
Do you want to stop smoking WP now?			
<i>I have never smoked WP</i>	568 (78.2%)	622(78.8%)	1190 (78.4%)
<i>I don't smoke WP now</i>	45(6.1%)	96 (12.1%)	141 (9.3%)
<i>Yes</i>	45(6.2)	30 (3.8%)	75(5.0%)
<i>No</i>	69 (9.5%)	42 (5.3%)	111 (7.3)
<i>Total</i>	727 (47.9%)	790 (52.1 %)	1517 (100%)

Table 3 -Binary logistic regression of WP smoking (Ever smoked WP) among students (n=1517)

Independent variables	AOR	CI 95%
Age <sup>c</sup>	0.86	0.68 - 1.09
Gender <sup>a</sup>		
Female	1.06	0.79 - 1.42
Male <sup>b</sup>	1	
Grade <sup>a</sup>		
Second <sup>e</sup>	0.83	0.57 - 1.19
Third <sup>f</sup>	1.70	1.10 - 2.63*
First <sup>b, d</sup>	1	
Ever tried or experimented with cigarette smoking, even one or two puffs		
Yes	1.57	1.12- 2.20**
No	1	
Parents are WP or cigarette smokers		
Yes	1.02	0.76-1.36
No	1	
Accept WP offered by best friend?		
Yes	3.31	2.17- 5.04****
No	1	

a= categorical variables; b=Reference group; c= Continuous variable; CI=Confidence interval; d= First level of high school; e= second level of high school; f= Third and final level of high school; OR= odds ratio; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001; \*\*\*\* p<0.0001.

Table 4 -Binary logistic regression of WP smoking (Current users) among students (n=1517)

Independent variables	AOR	CI 95%
Age <sup>c</sup>	0.87	0.60 - 1.25
Gender <sup>a</sup>		
Female	0.45	0.30 - 0.70 □ □ □ □
Male <sup>b</sup>	1	
Grade <sup>a</sup>		
Second <sup>e</sup>	0.99	0.57 - 1.72
Third <sup>f</sup>	1.54	0.79 - 3.04
First <sup>b, d</sup>	1	
Ever tried or experimented with cigarette smoking, even one or two puffs		
Yes	1.19	0.75- 1.90
No	1	
Parents are WP or cigarette smokers		
Yes	0.93	0.62-1.40
No	1	
Accept WP offered by best friend?		
Yes	4.36	2.69- 7.07****
No	1	

a= categorical variables; b=Reference group; c= Continuous variable; CI=Confidence interval; d= First level of high school; e= second level of high school; f= Third and final level of high school; AOR= adjusted odds ratio; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001; \*\*\*\* p<0.0001.

Figure 1- Waterpipe

